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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,504	03/25/2004	Taeghwan Hyeon	9907-004	8916
20575	7590	10/20/2005	EXAMINER	
MARGER JOHNSON & MCCOLLOM, P.C. 210 SW MORRISON STREET, SUITE 400 PORTLAND, OR 97204			HERTZOG, ARDITH E	
			ART UNIT	PAPER NUMBER
			1754	
DATE MAILED: 10/20/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/811,504

Applicant(s)

HYEON ET AL.

Examiner

Ardith E. Hertzog

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 March 2004 and 09 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-17 is/are rejected.
- 7) ☒ Claim(s) 2,3,6-8 and 11-13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 09 August 2004.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Information Disclosure Statement*

1. Receipt is acknowledged of the information disclosure statement (IDS) filed August 9, 2004. As the submission is in compliance with the provisions of 37 CFR § 1.97, the IDS has been considered, in accordance with the enclosed PTO-1449.

### *Minor Informalities*

2. The disclosure is objected to, because of the following minor informalities:
  - a. In claim 1, the first recited step, it appears that “solution” should be deleted after “metal-surfactant complex” (i.e., at p. 17, line 6) **or, alternatively**, in the second recited step, “solution” should be inserted after “metal-surfactant complex” (i.e., at p. 17, line 7), for consistency. Note that if the latter option is selected, then “solution” would **also** need to be inserted after “metal-surfactant complex” in **each of** claims 9, 14 **and** 15, for consistency.
  - b. In the preamble of **both** claims 7 **and** 8, “methods” should be “method”.
  - c. In claim 14, “complexes are” should be revised as “complex is”, for consistency with claim 1.
  - d. In claim 15, “complex” is misspelled.

Appropriate correction is required.

3. **Furthermore**, clarification is respectfully requested with respect to applicant's Step B **102**, per Figure 1. Specifically, in paragraph [0033] of corresponding pre-grant

publication US 2005/0214190 A1, applicant discloses a solution containing a surfactant and a reagent **in a solvent**, and in paragraph [0040], applicant discloses suitable solvents for use in this step. **However**, no solvent is noted in Step B **102** of Figure 1 (and the second recited step of the independent claim 1 (i.e., the “injecting...” step) also fails to recite such solvent).

### ***Drawings***

4. The drawings are objected to, because of the following minor informalities: In Figure 1, Step B **102**, “injection” is misspelled. **In addition, if a solvent is indeed required in this step** (per the request for clarification immediately above), **Figure 1 should be revised accordingly.**

5. **Corrected drawing sheets in compliance with 37 CFR § 1.121(d) are required in reply to the Office action to avoid abandonment of the application.**

Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended”. If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet”

or "New Sheet" pursuant to 37 CFR § 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. **Any objection to the drawings will not be held in abeyance.**

### ***Claim Objections***

6. Claim 6 is objected to under 37 CFR § 1.75(c) as being in improper form, because a multiple dependent claim should refer to other claims **in the alternative only** (whereas claim 6 now depends upon **both** claims 1 **and** 2). See MPEP § 608.01(n). **Accordingly, claim 6 has not been further treated on the merits.**

7. Claims 2, 3, 7, 8 and 11-13 are objected to, because of improper Markush group language (see MPEP § 2173.05(h) I.):

- a. In claim 2, "selected from a group of" should be revised as "selected from the group consisting of";
- b. In claim 3, "the group consisting of" should be inserted after "selected from";
- c. In claim 7, "the group consisting of" should be inserted after "selected from", **and**, in the last line, "of two or more surfactants listed above" should be revised as "thereof".
- d. In claim 8, "the group consisting of" should be inserted after "selected from", **and**, in the last line, "also" should be deleted.
- e. In **each of** claims 11, 12 **and** 13, "selected typically from" should be revised as "selected from the group consisting of" (noting related 35 U.S.C.

§ 112, second paragraph, rejection set forth in paragraph 12. below).

Appropriate correction is required.

***Claim Rejections - 35 U.S.C. § 112***

8. The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1-5 and 7-17 are rejected under 35 U.S.C. § 112, first paragraph, as based on a disclosure which is not enabling. That applicant's "reacting said reaction mixture..." step includes thermal decomposition, reduction, oxidation, sulfidation and phosphidation is evidently critical or essential to the practice of the invention (see abstract; paragraphs [0001], [0033], [0043] and [0044]; and examples of corresponding pre-grant publication US 2005/0214190 A1), but, since such limitation is not included in these claims, it is respectfully submitted that they are not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Again, based upon applicant's specification (plus abstract), it appears that the third step recited in the independent claim 1 (i.e., the "reacting..." step) **must** include thermal decomposition, reduction, oxidation, sulfidation and/or phosphidation. Therefore, inserting ", wherein said reacting includes one or more of thermal decomposition, reduction, oxidation, sulfidation and phosphidation," after "said nanorods" in the third step of claim 1;

replacing “pnictides” and “chalcogenides” with, respectively, “phosphides” and “sulfides” in the claim 1 preamble; **and** revising claim 11 as appropriate would be one means of overcoming this aspect of this rejection. **In addition, if a solvent is indeed required in the second recited step of the independent claim 1** (i.e., the “injecting...” step, per the request for clarification in paragraph 3. above), **then the claims should be revised accordingly**; that is, this solvent would then **also** be considered subject matter essential or critical to the practice of the invention, with its presence required in all claims in order to comply with 35 U.S.C. § 112, first paragraph (enablement). Inserting “in a solvent” after “a reagent” in the second step of claim 1 would be one means of overcoming this aspect of this rejection. Clarification and/or appropriate correction is required.

11. Claims 1-5, 7-14, 16 and 17 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Said claims are considered vague, indefinite, and/or confusing, due to the phrase “constant injection rate” in the independent claim 1. In particular, the term “constant” is considered a relative term which renders these claims unclear, since the term is not defined by the claim, **and** the specification does not **consistently** use this term when discussing applicant's injection rate—indeed, note that the term “constant” is **only** used in the abstract, while the related though **not** synonymous terms, “controlled” and “continuous”/“continuously” (see paragraphs [0029], [0033], Fig. 1; and paragraphs [0007], [0025]-[0027], [0052]-

[0058]<sup>1</sup>, especially paragraphs [0052] and [0058], of corresponding pre-grant publication US 2005/0214190 A1), are used everywhere else. That is, a “controlled” injection rate is **not** necessarily “constant”, while a substance may be “continuously” injected at varying—and hence not “constant”—rates (note enclosed definitions). Assuming applicant **does** mean a **constant** injection rate, then incorporating the limitations of claim 15 into claim 1 (i.e., inserting “between 1 mL/hr and 100 mL/hr” after “constant injection rate”) would be one means of overcoming this rejection. Appropriate correction is required.

12. Claims 2-5, 7, 8 and 11-13 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Said claims are considered vague, indefinite, and/or confusing, due to the following indefinite terms/phrases: “typically” in claims 2, 11 **and** 13; “typically” and “in particular” in claim 3; “typically” and “alkoxide **family**” (emphasis added) in claim 4; “typically” and “various” in claim 5; **and** “typically” and “such as” in claims 7, 8 **and** 12. With respect to “typically”, it is not clear if the limitations following this term are **actually required** or not by the claims; therefore, the intended scope of each of claims 2-5, 7, 8 and 11-13 cannot be accurately determined. With respect to “such as”, it is not clear if the limitations following this phrase are **actually required** or not by the claims; therefore, the intended scope of claims 7, 8 and 12 is **further** unclear. The phrase “in particular” renders the intended

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<sup>1</sup> It is noted that the **specific** injection rate has been omitted from paragraph [0054]. However, although evidently an inadvertent omission, it is not seen how the specification could be amended to include same, without raising the issue of new matter.



scope of claim 3 **further** unclear, as it cannot be determined if “the groups II through IX” are **necessarily** limited to “transition metals” or not. It is **further** not clear what alkoxides would or would not be within the scope of the “alkoxide **family**” (emphasis added), as recited in claim 4, nor what “metals” would or would not be encompassed by the term “various”, as recited in claim 5. Revising “alkoxide family” as “alkoxides” in claim 4, while deleting “various” from claim 5, would be one means of overcoming this aspect of this rejection. Appropriate correction is required.

13. Claims 8 and 12-17 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Said claims are considered vague, indefinite, and/or confusing, indefinite, and/or confusing, due to the following antecedent basis problems: In claim 8, it cannot be determined **which** “solvent” of claim 1 is being referenced: the “solvent” in the first recited step of claim 1; the “poor solvent” in the last recited step of claim 1; or both? In claim 12, “said oxidant” lacks proper antecedent basis in claim 1. In claim 13, “said reductant” lacks proper antecedent basis in claim 1. In **both** claims 14 **and** 15, “a solution” should be revised as “the solution”, for proper antecedent basis. In both claims 16 and 17, “said reaction **process**” (emphasis added) lacks proper antecedent basis in claim 1; replacing “reaction process” with “reacting” would be one means of overcoming this aspect of this rejection. Appropriate correction is required.

***Claim Rejections - 35 U.S.C. § 103***

14. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 1-5 and 7-17 are rejected under 35 U.S.C. § 103(a) as being obvious over US 2005/0036938 A1 (Hyeon). Initially, it is noted that the applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. § 102(e). Accordingly, this rejection under 35 U.S.C. § 103(a) might be overcome by: (1) a showing under 37 CFR § 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR § 1.131; or (3) an oath or declaration under 37 CFR § 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. § 104, together with a terminal disclaimer in accordance with 37 CFR § 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. § 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2). As for the applied reference, Hyeon **exemplifies** methods of synthesizing

**rod-shaped** CdS nanoparticles and **rod-shaped** MnS nanoparticles (i.e., metal chalcogenides, per the preamble of the instant independent claim 1), which, **with the exception of the explicit use of a syringe pump**, appear to comprise all steps **required** by instant claims 1-5 and 7-17 (see paragraphs [0053]-[0054] (Embodiment 6) and [0057]-[0058] (Embodiment 8)); note that in both these Hyeon examples, elemental sulfur reagent in oleylamine surfactant is **injected** into a metal-surfactant complex, which, absent evidence otherwise, is not considered unobviously distinct from applicant's step of injecting a metal-surfactant complex into a solution containing surfactant plus reagent, given that in both the reference and the instant application, the **same** result is **clearly** achieved—namely, the synthesis of metal chalcogenide nanorods. Further note that as Hyeon **exemplifies** the synthesis of metal chalcogenide nanorods via reactants and reaction conditions which fall within the scope of instant claims 1-5, 7-11, 14, 16 and 17, it is respectfully submitted that the rate of injection used in these nanorod examples must **inherently** meet the “constant” requirements of instant claims 1 and 15. **Moreover**, while use of a syringe pump for the injection step is not **explicitly** disclosed by Hyeon, it would have been obvious to one of ordinary skill in the art, at the time of applicant's invention, to have used a syringe pump in the Hyeon methods, because selection of **any** suitable injection means—including a syringe pump, already known for use in the synthesis of nanostructured materials (as evinced by both US 2002/0071952 A1 (see paragraphs [0035]-[0036]) and US 6,179,912 (see claim 3))—is considered to have been within the level of ordinary skill. Note that instant claims 12 and 13 have been included in this rejection, since each does not **require** the

synthesis of metal oxide nanorods and metal nanorods, respectively, but instead merely recites what the "oxidant" and "reductant" **may be**, with respect to the "metal oxides" and "metals" recited in the preamble of instant claim 1. Lastly, it is respectfully noted for the record that applicant's examples do not appear to fall within the scope of any instant claims, in that there appears to be no "reagent" used in instant Embodiments 1-4.

### ***Double Patenting***

16. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

17. A timely filed terminal disclaimer in compliance with 37 CFR § 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR § 1.130(b).

18. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR § 3.73(b).

19. Claims 1-5, 7-11 and 14-17 are **provisionally** rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6, 8, 9, 13 and 14 of copending application number 10/641,394 (i.e., all claims of the application corresponding to Hyeon applied *supra*). Although the conflicting claims are not identical, they are not considered patentably distinct from each other, for the following reasons: The copending claims, when read in light of the copending application (i.e., per the discussion of the Hyeon Embodiments 6 and 8 in paragraph 15. above), evidently **encompass** methods of synthesizing metal sulfide **nanorods**.

**Therefore**, methods falling within the scope of instant claims 1-5, 7-11 and 14-17—namely, methods of synthesizing metal **chalcogenide** nanorods—are considered to have been obvious to one of ordinary skill in the art, at the time of applicant's invention, given the copending claims, because the copending claims are, again, considered to encompass such methods, with use of a syringe pump injection step for the "mixing..." step recited therein (see copending independent claim 1) considered to have been *prima facie* obvious, in accordance with the explanation given in paragraph 15. above.

20. This is a **provisional** obviousness-type double patenting rejection, because the conflicting claims have not in fact been patented.

### **Conclusion**

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These references are considered cumulative to or less material than those discussed above. In particular, the various Alivisatos references cited on the


Art Unit: 1754


enclosed PTO-892 disclose formation of nanorods via methods which may comprise one or more injecting steps.

22. Any inquiry concerning this communication should be directed to Ardith E. Hertzog at 571-272-1347. The examiner can normally be reached on Monday through Friday (from about 8:00 a.m. - 4:00 p.m.).

23. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman, can be reached at 571-272-1358. The central fax number for all communications is now 571-273-8300.

24. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. For any questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
AEH  
October 17, 2005

  
**STEVEN BOS**  
**PRIMARY EXAMINER**  
**GROUP 1100**